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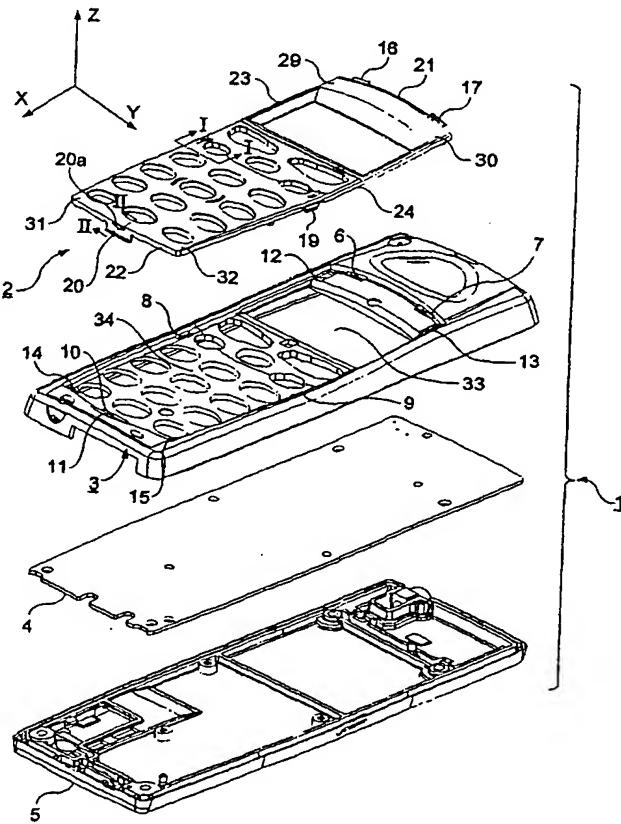
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(54) Title: AN EXCHANGEABLE PANEL

(57) Abstract

The invention provides an exchangeable panel (2) of a mobile radio station (1) and a method to manually secure an exchangeable panel (2) to a mobile radio station (1). The exchangeable panel (2) has at least one snap securing means (20) preferably placed at one edge (22) of the exchangeable panel (2). When manually securing the exchangeable panel (2) to the mobile radio station (1), for instance to a front-part (3) of a housing (3, 5) of the mobile radio station (1), the snap securing means (20) of the panel (2) is snapped together with a securing means (10) of the mobile radio station (1) whereby the securing means (10, 20) are mutually secured together. The securing means (10, 20) are hidden when mutually snapped together. Preferably the panel has also at one of its edges (21) at least one protrusion (16) which is inserted into a recess (6) of the mobile radio station (1) when the exchangeable panel (2) is secured to the mobile radio station (1).



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AN EXCHANGEABLE PANEL**TECHNICAL FIELD OF THE INVENTION**

5 The present invention relates to an exchangeable panel of a mobile radio station and a method to secure an exchangeable panel to a mobile radio station.

DESCRIPTION OF RELATED ART

10

Some portable radio communication apparatus devices are provided with a panel for aesthetic reasons. The panels can for instance be provided with different patterns and the user of the mobile radio station can choose a panel 15 with a certain pattern in order to personalize the mobile radio station. The panel can be secured for instance on the front or on a flip of the mobile radio station.

20 A portable radio communication apparatus device, which herein after is referred to as a mobile radio station, includes all portable radio communication apparatus devices such as mobile phones, pagers, communicators, so called electronic organizers, or the like.

25 It is an advantage if the panel is exchangeable since the user then can exchange the panel in order to personalize the mobile radio station. Mobile radio stations with exchangeable panels are known in the art. However, there are problems with the existing panels. One problem is that 30 it is necessary to use a tool in order to change the panel. Another problem is that the securing means are visible and hence the panel gives a clumsy impression.

SUMMARY OF THE INVENTION

The general problem dealt with by the present invention is to provide an exchangeable panel of a mobile radio station 5 which is easy for the user of the mobile radio station to exchange without using any adhesive or tools, or without having to unnecessarily bend the panel.

A more specific problem dealt with by the present 10 invention is to provide an exchangeable panel of a mobile radio station with securing means, which are not visible, when the panel is secured to the mobile radio station.

The problem is solved essentially by an exchangeable panel 15 which has at least one snap securing means preferably placed at one edge of the exchangeable panel. The exchangeable panel can be manually secured to a mobile radio station, for instance to a front-part of a housing of the mobile radio station. When manually securing the 20 exchangeable panel to the mobile radio station the snap securing means of the panel, preferably a snap-rib, is snapped together with a securing means of the mobile radio station, preferably a hole. The snap-rib is hidden when snapped into the hole, whereby the snap-rib and the hole 25 are mutually secured together. In a preferred embodiment of the present invention the panel has at one of its edges at least one protrusion which is inserted into a recess of the mobile radio station when the panel is secured to the mobile radio station. The snap-rib together with the 30 protrusion keep the panel from falling off the mobile radio station and they create the main securing function. However, the exchangeable panel can also be provided with further securing means such as snap-ribs at the side edges of the exchangeable panel. The exchangeable panel can also 35 be provided with guiding means such as guiding pins which

help the user to secure the exchangeable panel in a correct position when fastening the panel.

5 The general object of the present invention is to provide an exchangeable panel of a mobile radio station which is easy for the user of the mobile radio station to exchange without using any adhesive or tools.

10 A more specific object of the present invention is to provide an exchangeable panel of a mobile radio station with securing means, which are not visible, when the panel is secured to the mobile radio station.

15 The general advantage afforded by the present invention is that an exchangeable panel of a mobile radio station which is easy for the user to exchange without using any adhesive or tools or without having to unnecessarily bend the panel, is provided. It is an advantage for the user to be able to exchange the panel if the user for instance 20 wants to exchange a panel with a certain pattern to another panel with a different pattern.

25 A more specific advantage afforded by the present invention is that an exchangeable panel of a mobile radio station with securing means which are hidden and hence not visible, when the panel is secured to the mobile radio station, is provided.

30 A more specific advantage afforded by the present invention is that an exchangeable panel of a mobile radio station with securing means which are small and hence do not require any large space, is provided. For small mobile radio stations it is an advantage if the securing means are small since there is not much space left for any 35 securing means.

A more specific advantage afforded by the present invention is that an exchangeable panel of a mobile radio station with securing means which allows the user to remove the panel from the mobile radio station with a low 5 force and without using any strain. This is afforded by the present invention for an exchangeable panel which shall not move when secured to the mobile radio station.

10 The invention will now be described more in detail below with reference to the appended drawings which illustrate various aspects of the invention by means of embodiments. The invention is not limited to these embodiments.

15 It shall be emphasised that 'comprises/comprising' when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

20

BRIEF DESCRIPTION OF THE DRAWINGS

25 Fig 1 illustrates in an exploded, perspective view a mobile radio station with an exchangeable panel according to the present invention;

Fig 2 illustrates in a perspective view from below an exchangeable panel according to the present invention;

30 Fig 3 illustrates in an enlarged, assembled cross-sectional view taken along line I-I in Fig 1 a securing means used to secure an exchangeable panel to a front-part of a housing of a mobile radio station according to the present invention;

35

Fig 4 illustrates in an enlarged sectional view taken along line II-II in Fig 1 a securing means used to secure an exchangeable panel to a front-part of a housing of a mobile radio station according to the present invention.

5

DETAILED DESCRIPTION OF EMBODIMENTS

Fig 1 illustrates in an exploded, perspective view a mobile radio station 1.

10

The parts which the mobile radio station 1 comprise are a panel 2, a front-part 3 of a housing of the mobile radio station 1, a printed circuit board 4, and a rear-part 5 of the housing 3, 5 of the mobile radio station 1. Those parts are arranged to be assembled together. However, the panel 2 is removable, and the user of the mobile radio station 1 is able to manually remove the panel 2 from the mobile radio station 1 and then manually attach it again.

20 The front-part 3 comprises securing elements which are a first and a second essentially rectangular upper recess 6; 7, a first and a second side securing means 8; 9 and a first securing means 10. The first and the second side securing means are a first side hole 8 and a second side hole 9, respectively. The first securing means is a lower hole 10. The front-part 3 further comprises a lower access-means 11, which is a recess in the front-part 3 and a first, a second, a third and a fourth guiding recess 12; 13; 14; 15. The guiding recesses 12; 13; 14; 15 provide a 25 first guiding system 12, 13, 14, 15 of the mobile radio station 1 which helps the user to secure the panel 2 correctly to the front-part 3.

30 The panel 2 comprises further securing elements which are a first and a second upper protrusion 16; 17, a first and a second side securing means 18; 19 and a second securing

means 20 (see Fig 2 regarding the first side securing means 18). The first and the second side securing means are a first and a second side snap-rib 18; 19. The second securing means 20 is a lower snap-rib 20 provided with a 5 grip means 20a, which is a groove 20a. The first and the second upper protrusion 16; 17 are both placed at an upper edge 21 of the panel 2, the lower snap-rib 20 is placed essentially at the middle of a lower edge 22 of the panel 2, and the first and the second side snap-rib 18; 19 are 10 both placed at a first side edge 23 and at a second side edge 24, respectively, of the panel 2. The panel 2 further comprises a first, a second, a third, and a fourth guiding means 25; 26; 27; 28 (see Fig 2) placed at a first corner, a second corner, a third corner and a fourth corner 29; 15 30; 31; 32, respectively, of the panel 2. The guiding means 25; 26; 27; 28 provide a second guiding system 25, 26, 28, 28 of the panel 2 which is arranged to co-operate with the first guiding system 12, 13, 14, 15 of the mobile radio station 1.

20

The user of the mobile radio station 1 can easily manually secure the panel 2 to the mobile radio station 1 by - in a first step - inserting the first and the second upper protrusion 16; 17, respectively, into the first and the 25 second upper recess 6; 7, respectively, of the front-part 3. In a next step the lower snap-rib 20 is pressed inwards towards the middle of the panel 2 during insertion of the snap-rib 20 into the lower hole 10. In a next step the lower snap-rib 20 is manually snapped into the lower hole 30 10 in the front-part 3 whereby the lower snap-rib 20 and the lower hole 10 are mutually secured to each other and whereby the panel 2 is secured to the mobile radio station. The snap-rib 20 is hidden when snapped into the hole 10. The lower access-means 11 of the front-part 3 35 makes it possible for the user to smoothly insert the lower snap-rib 20 into the lower hole 10. Finally, in a last step, the first side snap-rib 18 and the second side

5 snap-rib 19 are manually snapped into the first side hole 8 and the second side hole 9, respectively, in the front-part 3 whereby the side snap-ribs 18; 19 are mutually secured to the side holes 8; 9. Both the first snap-rib 18 and the second snap-rib 19 are hidden when they are snapped into the first side hole 8 and the second side hole 9, respectively.

10 The first guiding system of the mobile radio station 1, i.e. the guiding recesses 12; 13; 14; 15, which co-operate with the second guiding system of the panel 2, i.e. the guiding pins 25; 26; 27; 28, helps the user to smoothly secure the panel 2 in a correct position to the front-part 3. The first and the second upper guiding pins 25; 26 are 15 rotation guiding pins which are arranged to be manually inserted into the first and the second guiding recess 12; 13, respectively. The third and the fourth lower guiding pin 27; 28 are rotation guiding pins which are arranged to be manually inserted into the third and the fourth guiding 20 recess 14; 15, respectively. After having inserted the first and the second upper protrusion 16; 17, respectively, into the first and the second upper recess 6; 7, respectively, of the front-part 3 the guiding pins 25; 26; 27; 28 are inserted into the guiding recesses 12; 25 13; 14; 15 during the insertion of the lower snap-rib 20 into the lower hole 10. The upper rotation guiding pins 25; 26 guide the panel 3 in Z rotation and the lower cartesian guiding pins 27; 28 guide the panel 3 in X and Y 30 directions (see system of coordinates in Fig 1 regarding the directions).

35 The lower snap-rib 20 together with the upper protrusions 16; 17 keep the panel 2 from falling off the mobile radio station 1 and they create the main securing function. The side snap-ribs 18; 19 secure the panel closely to the front-part 3. Hence, no noise is made when buttons of the

mobile radio station 1 are pressed by the user when the panel 2 is secured to the mobile radio station.

When the panel 2 is secured to the mobile radio station 1,
5 the panel 2 can easily be removed by - in a first step -
pressing the lower snap-rib 20 towards the middle of the
panel 2, and by in a next step manually lifting the panel
2 away from the front-part 3. It is easy for the user to
press the lower snap-rib 20 towards the middle of the
10 panel 2 by inserting a finger in the lower access-means 11
and then lifting the panel 2. The snap-rib 20 is pressed
inwards towards the middle of the panel when the panel 2
is lifted. The groove 20a helps the user to grab hold of
the snap-rib 20. Hence, when the panel 2 is removed from
15 the front-part 3, in a first step, the lower snap-rib 20
is pressed towards the middle of the panel, then the lower
snap-rib 20 is unfastened from the lower hole 10, then the
panel 2 is lifted away from the front-part 3 whereby the
side-snap ribs 18; 19 are unfastened from the side holes
20 8; 9 and the upper protrusions 16; 17 are removed from the
upper recesses 6; 7.

Since it is easy for the user both to manually secure the
panel 2 to the mobile radio station 1 and to manually
25 remove the panel 2 from the mobile radio station 1, it is
possible for the user to easily exchange the panel 2 to
another panel.

In the embodiment of the present invention shown in Fig 1
30 the panel 2 is arranged to be secured to the front-part 3
of the housing 3, 5 of the mobile radio station 1.
However, in other embodiments of the present invention a
panel could be secured to other parts of a mobile radio
station, such as for instance to a flip of a mobile radio
35 station. Also, in the embodiment of the present invention
shown in Fig 1 the panel 3 covers also a display-area 33
of the mobile radio station 1. However, in other

embodiments of the present invention the panel could cover only a keyboard-area 34 and not the display-area 33 of the mobile radio station 1.

5 The invention is not limited to the embodiments of the present invention presented in Figs 1-4. For instance, the securing means 18; 19; 20 of the panel 2 can be ball joints wherein the corresponding securing means 8; 9; 10 of the mobile radio station 1 are securing socket joints.

10 The groove 20a could for instance be a protrusion. It is also to be emphasised that that the snap securing means 18; 19; 20 of the panel 2, arranged to be snapped together with the securing means 8; 9; 10 of the mobile radio station 1, can be any securing means which are arranged to

15 be snapped together with other securing means, i.e. for instance a wedge or a spring-loaded pin.

The explosion view of the mobile radio station 1 in Fig 1 is a schematic view; some detailed parts of the mobile

20 radio station 1 such as screws are not shown.

Fig 2 illustrates in a perspective view the rear-side of the exchangeable panel 2 with its several securing elements. Those securings elements are the first and the

25 second upper protrusion 16; 17, the first and the second side snap-rib 18; 19 and the lower snap-rib 20 provided with the groove 20a. The first and the second upper protrusion 16; 17 are placed at the upper edge 21 of the panel 2. The first side snap-rib 18 is placed at the first side edge 23 of the panel 2 and the second side snap-rib 19 is placed at the second side edge 24 of the panel 2. The lower snap-rib 20 is placed at the lower edge 22 of the panel 2.

35 The panel 2 has also on its rear-side the first, the second, the third and the fourth guiding means 25; 26; 27; 28 which are placed at the first, the second, the third

and the fourth corner 29; 30; 31; 32, respectively, of the panel 2.

5 Figs 3 and 4 illustrate securing elements used to secure the panel 2 to the front-part 3 of the housing 3, 5 of the mobile radio station 1.

10 In Fig 3 is illustrated in detail the first side snap-rib 18 of the panel 2 inserted in the first side hole 8 in the front-part 3 and snap-fastened to the front-part 3.

15 In Fig 4 is illustrated in detail the lower snap-rib 20 of the panel 2 secured to the essentially rectangular lower hole 10 in the front-part 3. The lower access-means 11 of the front-part 3 is also illustrated. The lower access-means 11, which is a recess in the front-part 3, makes it possible for the user to get access to the lower snap-rib 20. The groove 20a of the snap-rib 20 helps the user to grab hold of the panel 2 when the panel shall be removed
20 from the front-part 3.

CLAIMS

1. An exchangeable panel (2) of a mobile radio station (1), wherein the mobile radio station (1) and the panel (2) have at least a first and a second co-operating securing means (10, 20),

characterised in that at least one of the securing means (10, 20) is a snap securing means (20), wherein the first securing means (10) and the second

securing means (20) are arranged to be manually snapped together in order to secure the panel (2) to the mobile radio station (1) in a manually releasable way, and wherein the first securing means (10) and the second securing means (20) are hidden when mutually secured to each other.

2. A panel according to claim 1,

characterised in that the first securing means is a hole (10) in a front-part (3) of a housing (3, 5) of the mobile radio station (1).

3. A panel according to any of claims 1-2,

characterised in that the second securing means is a snap-rib (20) of the panel (2).

25 4. A panel according to any of claims 1-3,

characterised in that the panel (2) is provided with a grip means (20a) arranged to help a user of the mobile radio station (1) to grab hold of the panel (2) when the panel (2) is secured to the mobile radio station (1).

5. A panel according to claim 4,

characterised in that the second securing means (20) is placed essentially at the middle of a lower edge (22) of the panel (2) and that the grip means is a groove (20a) in the second securing means (20).

6. A panel according to any of claims 4-5,
characterised in that the grip means (20a) is
arranged to be manually accessed via an access-means (11)
of a front-part (3) of a housing (3, 5) of the mobile
5 radio station (1) when the first securing means (10) and
the second securing means (20) are mutually secured to
each other.

7. A panel according to any of claims 1-6,
10 characterised in that the panel (2) at one of
its edges (21) has at least a first protrusion (16)
arranged to be manually inserted into at least a first
recess (6) of the mobile radio station (1) in order to
secure the panel (2) to the mobile radio station (1).

15 8. A panel according to any of claims 1-6,
characterised in that the panel (2) at its
upper edge (21) has a first protrusion (16) and a second
protrusion (17) arranged to be manually inserted into a
20 first recess (6) and a second recess (7), respectively, of
a front-part (3) of a housing (3, 5) of the mobile radio
station (1) in order to secure the panel (2) to the mobile
radio station (1).

25 9. A panel according to any of claims 1-8,
characterised in that the panel (2) has at
least a first side securing means (18) arranged to be
manually secured to at least a first side securing means
(8) of the mobile radio station (1) in order to secure the
30 panel (2) to the mobile radio station (1), wherein the
first side securing means (18) of the panel (2) is placed
at a first side edge (23) of the panel, and wherein the
first side securing means (18) of the panel (2) and the
first side securing means (8) of the mobile radio station
35 (1) are hidden when mutually secured to each other.

10. A panel according to any of claims 1-8,
characterised in that the panel (2) has a
first side snap-rib (18) and a second side snap-rib (19)
which are arranged to be manually snapped into a first
5 side hole (8) and a second side hole (9), respectively, in
a front-part (3) of a housing (3, 5) of the mobile radio
station (1) in order to secure the panel (2) to the mobile
radio station (1), wherein the first side snap-rib (18) is
placed at a first side edge (23) of the panel and the
10 second side snap-rib (19) is placed at a second side edge
(24) of the panel (2), and wherein the first side snap-rib
(18) and the second side snap-rib (19), respectively, are
hidden when mutually secured to the first side hole (8)
and the second side hole (9), respectively.

15

11. A panel according to any of claims 1-10,
characterised in that the mobile radio
station (1) has a first guiding system (12, 13, 14, 15)
which is arranged to co-operate with a second guiding
20 system (25, 26, 27, 28) of the panel (2).

12. A panel according to claim 11,
characterised in that the first guiding
system (12, 13, 14, 15) comprises a first guiding recess
25 (12), a second guiding recess (13), a third guiding recess
(14) and a fourth guiding recess (15), respectively, of a
front-part (3) of a housing (3, 5) of the mobile radio
station, and that the second guiding system
(25, 26, 27, 28) comprises a first guiding means (25), a
30 second guiding means (26), a third guiding means (27) and
a fourth guiding means (28), wherein each guiding means is
placed at a first corner (29), a second corner (30), a
third corner (31) and a fourth corner (32), respectively,
of the panel (2) and wherein the second guiding system
35 (25, 26, 27, 28) is arranged to be manually inserted into
the first guiding system (12, 13, 14, 15).

13. A panel according to claim 12, characterised in that the first guiding means (25) and the second guiding means (26), respectively, are rotation guiding pins (25, 26) each placed at the first corner (29) and the second corner (30), respectively, near an upper edge (21) of the panel (2).

14. A panel according to claim 12, characterised in that the third guiding means (27) and the fourth guiding means (28), respectively, are cartesian guiding pins (27, 28) each placed at the third corner (31) and the fourth corner (32), respectively, near a lower edge (22) of the panel (2).

15 15. A front-part (3) of a housing (3, 4) of a mobile radio station (1), characterised in that the front-part (3) is adapted to comprise an exchangeable panel (2) according to any of claims 1-14.

20 16. A mobile radio station (1), characterised in that the mobile radio station (1) is adapted to comprise an exchangeable panel (2) according to any of claims 1-14.

25 17. A method for removably securing an exchangeable panel (2) to a mobile radio station (1), wherein a first securing means (10) of the mobile radio station (1) and a second securing means (20) of the panel (2) are mutually secured to each other, characterised by
30 manually snapping together the first securing means (10) with the second securing means (20) in order to secure the panel (2) to the mobile radio station (1) in a manually releasable way, wherein the first securing means (10) and the second securing means (20) are hidden when mutually secured to each other.

18. A method according to claim 17,
characterised in that the first securing
means is a hole (10) in a front-part (3) of a housing
(3, 5) of the mobile radio station (1).

5

19. A method according to any of claims 17-18,
characterised in that the second securing
means is a snap-rib (20) of the panel (2).

10 20. A method according to any of claims 17-19,
characterised in that the second securing
means (20) is placed essentially at the middle of a lower
edge (22) of the panel (2).

15 21. A method according to any of claims 17-20,
characterised in that the method further
comprises the step of manually inserting at least a first
protrusion (16) placed at one edge (21) of the panel (2)
into at least a first recess (6) of the mobile radio
20 station (1) in order to secure the panel (2) to the mobile
radio station (1).

22. A method according to any of claims 17-20,
characterised in that the method further
25 comprises the step of manually inserting a first
protrusion (16) and a second protrusion (17) placed at an
upper edge (21) of the panel into a first recess (6) and a
second recess (7), respectively, of a front-part (3) of a
housing (3, 5) of the mobile radio station (1) in order to
30 secure the panel (2) to the mobile radio station (1).

23. A method according to any of claims 17-22,
characterised in that the method further
comprises the step of manually securing at least a first
35 side securing means (18) of the panel (2) to at least a
first side securing means (8) of the mobile radio station
(1) in order to secure the panel (2) to the mobile radio

station (1), wherein the first side securing means (18) of the panel (2) is placed at a first side edge (23) of the panel, and wherein the first side securing means (18) of the panel (2) and the first side securing means (8) of the 5 mobile radio station (1) are hidden when mutually secured to each other.

24. A method according to any of claims 17-22, characterised in that the method further 10 comprises the steps of:

- manually snapping a first side snap-rib (18) of a first side edge (23) of the panel (2) into a first side hole (8) in a front-part (3) of a housing (3, 5) of the mobile 15 radio station (1) in order to secure the panel (2) to the mobile radio station (1); and

- manually snapping a second side snap-rib (19) of a second side edge (24) of the panel (2) into a second side 20 hole (9) in a front-part (3) of a housing (3, 5) of the mobile radio station (1) in order to secure the panel (2) to the mobile radio station (1).

25. A method according to any of claims 17-24, characterised in that the method further 25 comprises the step of manually inserting a second guiding system (25, 26, 27 28) of the panel (2) into a first guiding system (12, 13, 14, 15) of the mobile radio station (1).

30 26. A method according to any of claims 17-24, characterised in that the method further comprises the steps of:

35 - inserting a first guiding means (25) placed at a first corner (29) of the panel (2) into a first guiding recess

(12) of a front-part (3) of a housing (3, 5) of the mobile radio station (1);

5 - inserting a second guiding means (26) placed at a second corner (30) of the panel (2) into a second guiding recess (13) of the front-part (3);

10 - inserting a third guiding means (27) placed at a third corner (31) of the panel (2) into a third guiding recess (14) of the front-part (3); and

15 - inserting a fourth guiding means (28) placed at a fourth corner (32) of the panel (2) into a fourth guiding recess (15) of the front-part (3).

27. A method according to any of claims 17-24, characterised in that the method further comprises the steps of:

20 - inserting a first rotation guiding pin (25) placed at a first corner (29) near an upper edge (21) of the panel (2) into a first guiding recess (12) of a front-part (3) of a housing (3, 5) of the mobile radio station (1);

25 - inserting a second rotation guiding pin (26) placed at a second corner (30) near the upper edge (21) of the panel (2) into a second guiding recess (13) of the front-part (3);

30 - inserting a third cartesian guiding pin (27) placed at a third corner (31) near a lower edge (22) of the panel (2) into a third guiding recess (14) of the front-part (3); and

35 - inserting a fourth cartesian guiding pin (28) placed at a fourth corner (32) near the lower edge (22) of the panel

(2) into a fourth guiding recess (15) of the front-part (3).

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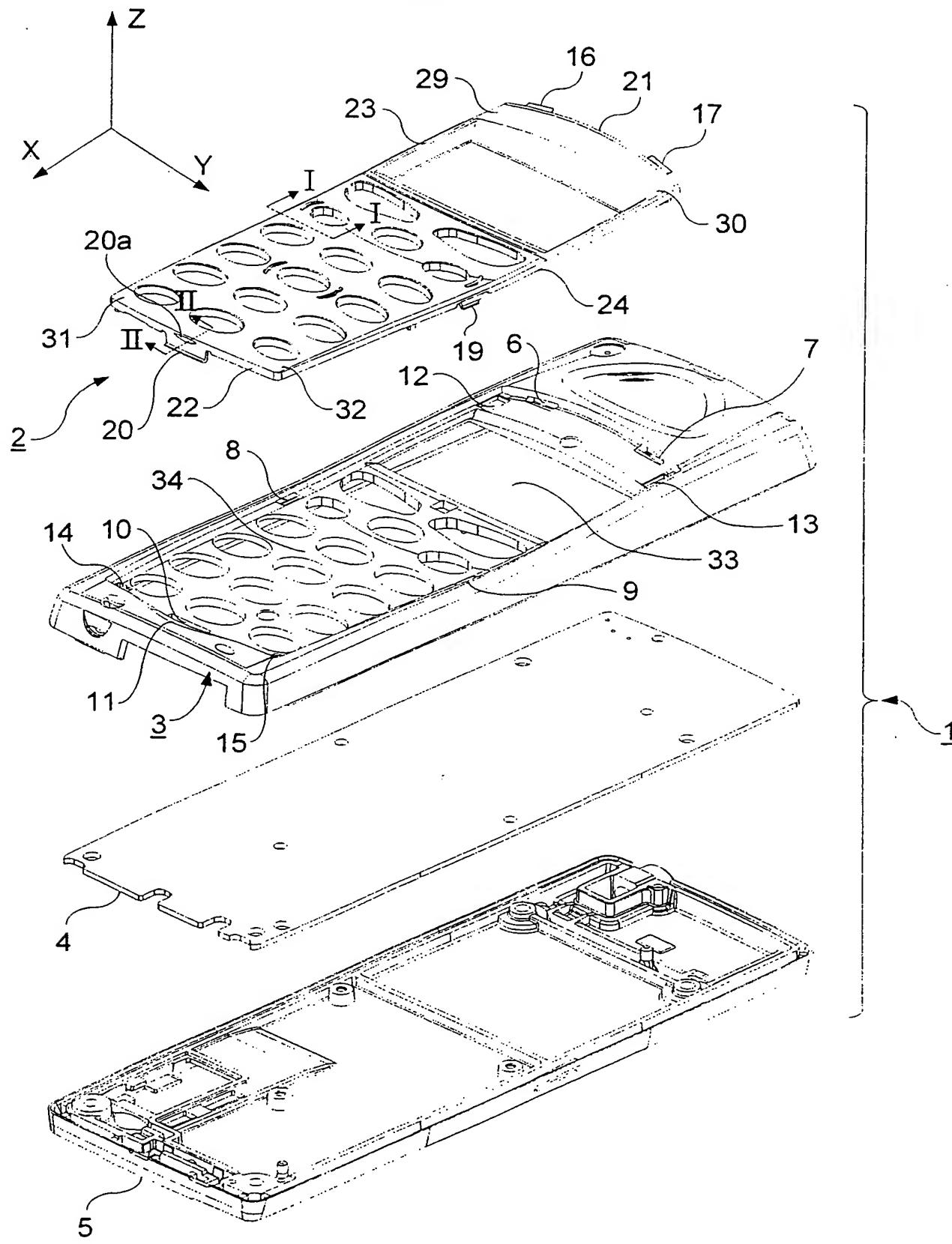


Fig. 1

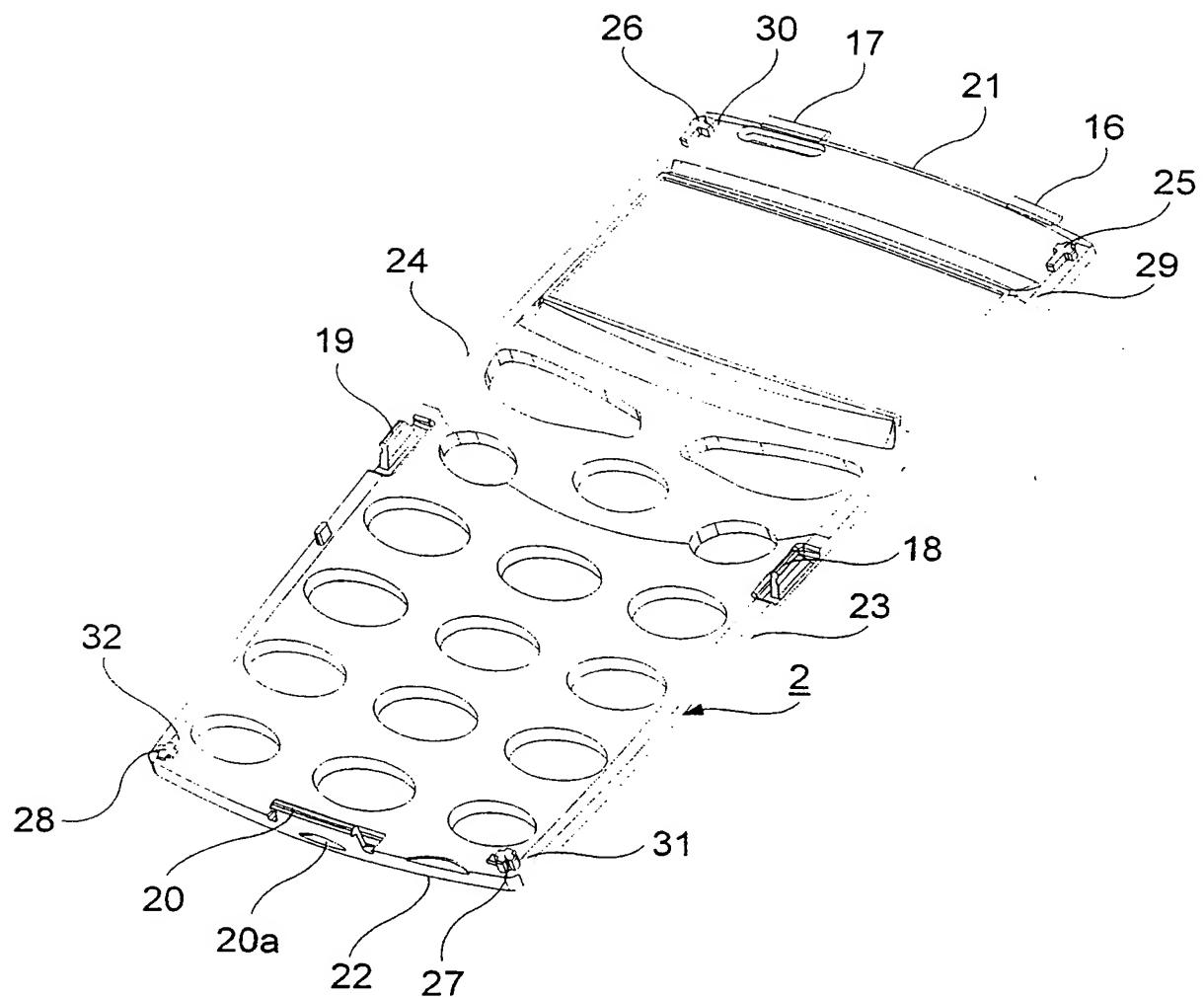


Fig. 2

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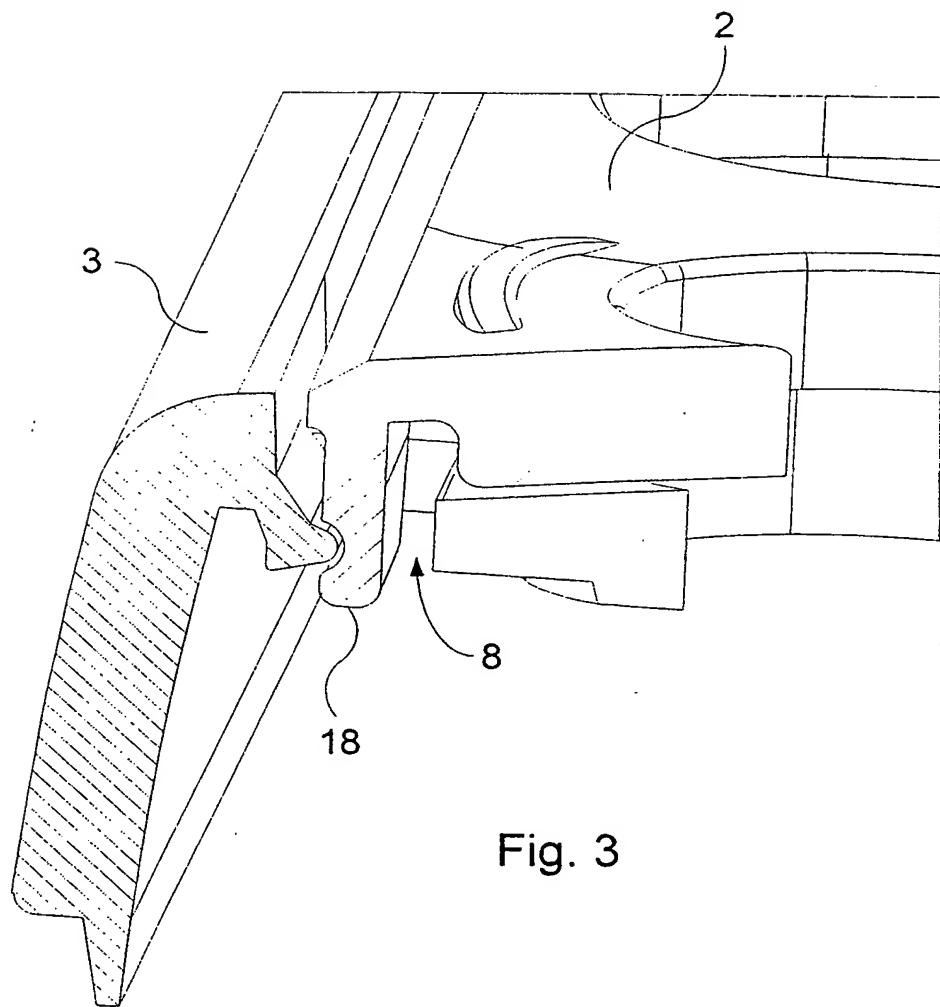


Fig. 3

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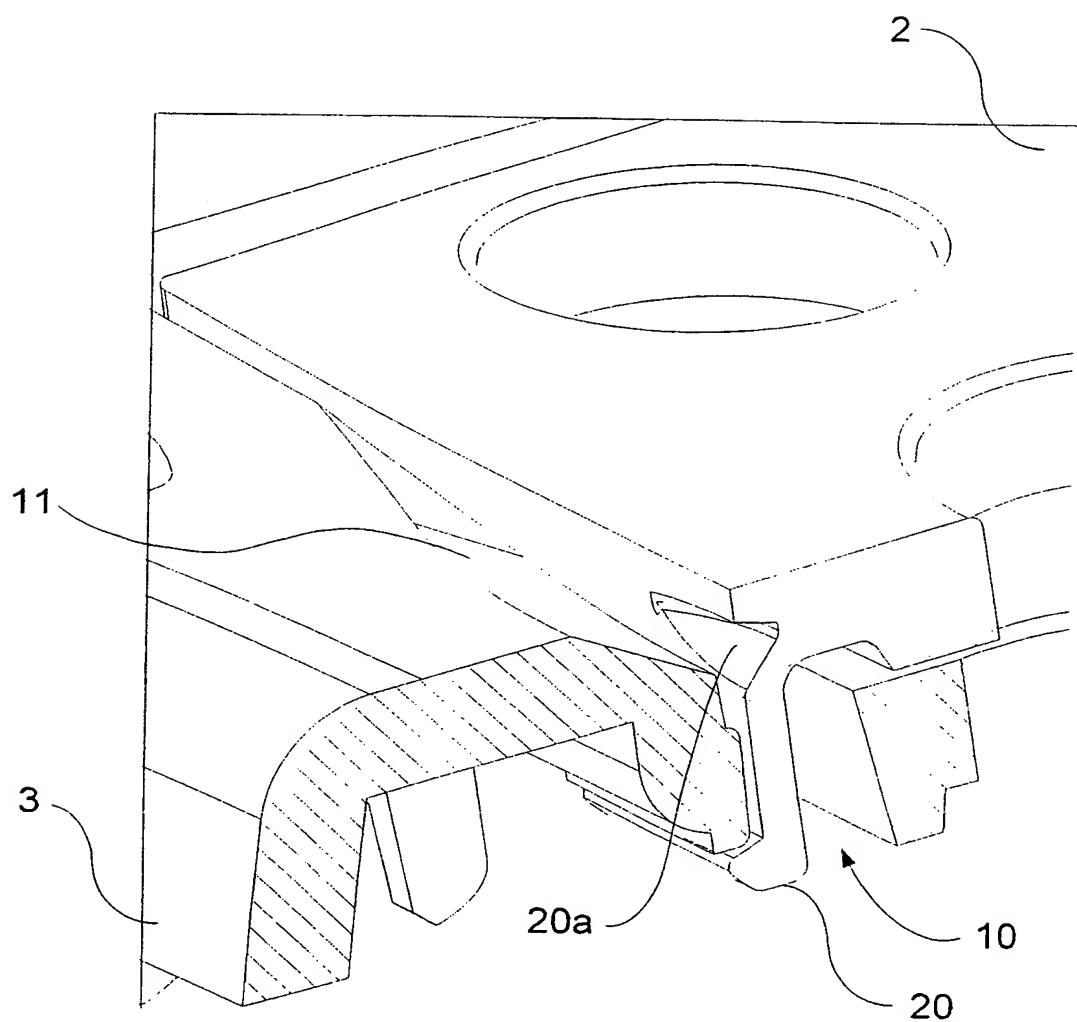


Fig. 4

1
INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/00393

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04M 1/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2305810 A (MOTOROLA INC), 16 April 1997 (16.04.97), page 6, line 35 - page 7, line 11; page 7, line 29 - page 8, line 15, figure 2, pos. 138-150, pos. 172-180 -- -----	1-10,15-24

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier document but published on or after the international filing date	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family

Date of the actual completion of the international search

14 June 2000

Date of mailing of the international search report

12 -07- 2000

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INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No.

PCT/SE 00/00393

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